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EXAMINER	
LIN, SHERMAN L	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/772,138	AHMED ET AL.	
	Examiner	Art Unit	
	SHERMAN LIN	2447	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-107* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-107* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *18 May 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-107 are pending.

Specification

2. The disclosure is objected to because of the following informalities:

- On page 15 line 13, "cross-layer transmitter/receiver 506 maybe the same" should be "cross-layer transmitter/receiver 506 may be the same";
- On page 22 section 92, "Node-Initiated and Reactive" should be "Node-Initiated and Proactive"; and
- On page 22 section 93 line 1, "node-initiated and reactive case", should be "node-initiated and proactive case".

Appropriate correction is required.

Claim Objections

3. Claims 1, 10, 15, 19, 33, 37, 51, 55, 64, 71, 78, 86, 88, 96, 98, and 106 are objected to because of the following informalities:

- In claim 1 lines line 8, use of "should" causes the limitations of the claim to be indefinite;
- In claim 10 lines 13-14, "nodes waiting for" should be "nodes, said at least one node waiting for;"
- In claim 15 line 4, use of "should" causes the limitations of the claim to be indefinite;

- In claim 19 line 6, "capable communicating with a second" should be "capable of communicating with a second";
- In claim 19 line 9, use of "should" causes the limitations of the claim to be indefinite;
- In claim 33 line 5, use of "should" causes the limitations of the claim to be indefinite;
- In claim 37 line 8, use of "should" causes the limitations of the claim to be indefinite;
- In claim 51 line 5, use of "should" causes the limitations of the claim to be indefinite;
- In claim 55 line 4, use of "should" causes the limitations of the claim to be indefinite;
- In claim 64 line 6, use of "should" causes the limitations of the claim to be indefinite;
- In claim 71 line 5, use of "should" causes the limitations of the claim to be indefinite;
- In claim 78 line 5, use of "should" causes the limitations of the claim to be indefinite;
- In claim 86 line 5, use of "should" causes the limitations of the claim to be indefinite;
- In claim 88 line 6, use of "should" causes the limitations of the claim to be indefinite;

- In claim 96 line 5, use of "should" causes the limitations of the claim to be indefinite;
- In claim 98 line 6, use of "should" causes the limitations of the claim to be indefinite; and
- In claim 106 line 5, use of "should" causes the limitations of the claim to be indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 19-35, 37-55, 63-78, and 88-107 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 19 lacks the necessary physical articles or objects to constitute a machine, manufacture, process, or a composition of matter within the meaning of 35 U.S.C. 101. As such, the claim fails to fall within a statutory category. It is, at best, functional descriptive material *per se*. Claims 20-35, 64-70, and 88-97 are likewise rejected.

With respect to claim 37, on page 14, lines 1-5 of the specification applicant has provided evidence that applicant intends a computer readable medium to include transmission type media; such as a signal, as such the claim is drawn to a form of energy. Energy is not one of the four categories of invention and therefore the claim(s) is/are not statutory. Energy is not a series of steps or acts and thus is not a process.

Energy is not a physical article or object and as such is not a machine or manufacture. Energy is a not combination of substances and therefore not a composition of matter. Claims 38-54, 71-77, and 98-107 are likewise rejected.

Claim 55 is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to particular machine, or (2) transform underlying subject matter (such as an article or material) to a different state or thing. See page 10 of In Re Bilski 88 USPQ2d 1385. The instant claims are neither positively tied to a particular machine that accomplishes the claimed method steps nor transform underlying subject matter, and therefore do not qualify as a statutory process. The method of network communications including steps of associating a node with a sub-network and determining which one of the plurality of CCA-capable nodes should be assigned to be a gateway CCA are broad enough that the claim could be completely performed mentally, verbally or without a machine nor is any transformation apparent. Claim 78 is likewise rejected.

Claim 63 is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to particular machine, or (2) transform underlying subject matter (such as an article or material) to a different state or thing. See page 10 of In Re Bilski 88 USPQ2d 1385. The instant claims are neither positively tied to a particular machine that accomplishes the claimed method steps nor transform underlying subject matter, and therefore do not qualify as a

statutory process. The method of network communications including the step of providing a node capable of being mobile is broad enough that the claim could be completely performed mentally, verbally or without a machine nor is any transformation apparent.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-12, 17-30, 35-48, 53-83, 88-93, and 98-103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corson et al. ("Internet-Based Mobile Ad Hoc Networking", IEEE Internet Computing, July-August 1999, pages 63-70) in view of Novaes (US Patent No. 6,732,189 B1).

With respect to claim 1, Corson teaches a method for increasing the fault tolerance in a network, said method comprising acts of:

associating a plurality of nodes with a sub-network, each of said plurality of nodes capable of sending and receiving data (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10); and

adding a plurality of cross layer communication agent capable nodes, herein referred to as CCA-capable nodes, to said sub-network, said plurality of CCA-capable nodes capable of receiving data from and sending data to said plurality of nodes (i.e., mobile router interfaces with a fixed router from a fixed network and facilitates routing of communication between mobile nodes on page 65 right column lines 6-14 and fig. 2).

Corson does not teach determining an assignment for a gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches

determining which one of the plurality of CCA-capable nodes should be assigned to be a gateway CCA (i.e., determining which node in a subnetwork is available to become a subnetwork leader in col. 9 lines 16-18), whereby said gateway CCA is used by each one of said plurality of nodes within said sub-network (i.e., only one subnetwork leader in a subnetwork receiving and processing messages from nodes on col. 9 lines 29-31) to communicate with the rest of the network (i.e., maintaining reachability of nodes for multicast communications in col. 4 lines 39-44).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 2, Corson does not teach querying a gateway CCA or assigning a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of determining further comprising sub-acts of:

designating one of the plurality of CCA-capable nodes as the gateway CCA (i.e., determine an available node can become a subnetwork leader based on it having the highest or lowest network address in col. 9 lines 13-18);

querying the gateway CCA from each node to determine whether it is active and awaiting a response (i.e., beacon messages are sent to the subnetwork leader in col. 9 lines 26-31; the node can expect a master list message from the subnetwork leader node as response, which indicates it is active and also listening for beacon messages in col. 10 lines 37-41), and when:

the gateway CCA responds, repeating the querying act (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response, sends master list messages in col. 10 lines 43-47); otherwise,

broadcasting a solicit message for receipt by CCA-capable nodes and awaiting a response (i.e., nodes can negotiate an election of a new leader by exchanging beacon messages with each other in col. 9 lines 18-22), and when:

a CCA-capable node responds, assigning a CCA-capable node as the gateway CCA (i.e., a node can respond by asserting its subnetwork leader status in col. 10 lines 65-67); otherwise,

repeating the broadcasting act (i.e., the beacon nodes exchange messages with other nodes continually in col. 11 lines 20-28).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 3, Corson does not teach selecting a single CCA-capable node as the gateway for all nodes. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches when a plurality of CCA-capable nodes respond, selecting from the plurality of CCA-capable nodes responding, a single CCA-capable node for use by all of the nodes as the gateway CCA (i.e., only one node in a subnetwork is tasked with the leader role in normal operation in col. 9 lines 19-23). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 4, Corson does not teach a network ID or selecting a gateway based on it having the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of selecting from the plurality of CCA-capable nodes responding comprises acts of:

determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 5, Corson does not teach querying a CCA-capable node for activity or changing a gateway CCA assignment. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of determining further comprises acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., determine an available node that can become a subnetwork leader based on it having the highest or lowest network address in col. 9 lines 13-18);

querying the plurality of CCA-capable nodes, from each node, to determine whether they are active and awaiting a response (i.e., beacon messages are sent to the subnetwork leader in col. 9 lines 26-31; the node can expect a master list message from the subnetwork leader node indicating it is active and also listening for beacon messages in col. 10 lines 37-41), and when:

the gateway CCA responds, repeating the querying act (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response sends master list messages in col. 10 lines 43-47); otherwise,

changing the CCA-capable node assigned to be the gateway CCA based upon a response from the plurality of CCA-capable nodes (i.e., a node can respond by asserting its subnetwork leader status in col. 10 lines 65-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 6, Corson does not teach selecting a single gateway CCA for use by all the nodes in a subnetwork. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches when a plurality of CCA-capable nodes respond, selecting from the plurality of CCA-capable nodes responding, a single CCA-capable node for use by all of the nodes as the gateway CCA (i.e., only one node in a subnetwork is tasked with the leader role in normal operation in col. 9 lines 19-23). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 7, Corson does not teach determining a network ID and selecting a gateway based on the network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of selecting from the plurality of CCA-capable nodes responding comprises acts of:

determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e.,

determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 8, Corson does not teach compiling or updating a list of CCA-capable nodes or selecting a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches an act of determining further comprising acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., election of a subnetwork leader to become a network leader in col. 14 lines 48-56);

compiling a list of CCA-capable nodes on at least one CCA-capable node (i.e., compiling a master list or host address list in col. 13 lines 62-64; and host address list contains identifications of subnetwork leaders in col. 6 lines 9-12);

querying each CCA-capable node, from at least one CCA-capable node, in the list to determine its state (i.e., using a host address list to periodically query the reachability of subnetwork leaders in col. 18 lines 30-33);

updating the list of CCA-capable nodes based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64); and

checking for a response from the gateway CCA (i.e., monitor the health of a tier leader in step 1220 of fig. 12), and when:

the gateway CCA responds, repeating the querying act (i.e., monitoring the health of a tier leader leads back to step 1208 in fig. 12); otherwise,

transmitting the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67); and

selecting and assigning a new gateway CCA from the list of CCA-capable nodes (i.e., if all nodes are capable of being a gateway CCA, the configuration file is a list of all these nodes such that a network leader is elected amongst them in col. 14 lines 52-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast

unreachable subnetwork.

With respect to claim 9, Corson does not teach selecting a CCA-capable node having the lowest determined network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of selecting and assigning a new gateway CCA comprising acts of:

determining a network ID for each of the CCA-capable nodes in the list of CCA-capable nodes (i.e., IP addresses are determined in a configuration file in col. 14 table 14); and

selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 10, Corson does not teach querying or updating a list in order to select a new gateway CCA. Novaes, in order to elect a new subnetwork leader

for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of determining further comprising acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., election of a network leader in col. 14 lines 48-56);

querying each CCA-capable node, from at least one CCA-capable node, in the plurality of CCA-capable nodes to determine its state (i.e., querying other subnetwork leaders until all reachable subnetwork leaders have been queried in col. 15 lines 6-14);

updating a list of CCA-capable nodes, stored on the at least one CCA-capable node, based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64);

sending, from the at least one CCA-capable node, the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67);

waiting to repeat the querying act (i.e., periodically monitoring the reachability of a subnetwork leader in col. 18 lines 32-33); and

checking, by at least one node in the plurality of nodes, the list of CCA-capable nodes for the gateway CCA (i.e., querying other subnetwork leaders for a network leader in col. 15 lines 6-14;

subnetwork leaders are multicast reachable from the list of nodes in col. 13 lines 44-48), and when:

the gateway CCA is in the list of CCA-capable nodes waiting for the next list of CCA-capable nodes (i.e., the confirmed network leader expects to receive subnetwork list messages from subnetwork leaders in col. 13 lines 59-64); otherwise,

selecting and assigning a new gateway CCA from the list of CCA-capable nodes (i.e., if all the nodes in a list are capable of being a gateway CCA, electing a new network leader from one of the nodes in a configuration file in col. 14 lines 48-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 11, Corson does not teach determining a network ID and then selecting, as the gateway CCA, the one with the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of selecting and assigning from the list of CCA-capable nodes comprising acts of:

determining a network ID for each of CCA-capable nodes in the list of CCA-capable nodes (i.e., IP addresses are determined in a configuration file in col. 14 table 14); and

selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 12, Corson does not teach designating only one of a plurality of capable nodes to be a gateway, broadcasting a message or selecting a gateway based on the broadcasted message. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of determining further comprising acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., electing a network leader by calculating a gravitational weight in col. 14 lines 48-56);

broadcasting a message from each CCA-capable node to the plurality of nodes (i.e., IP trace routing messages sent to calculate the number of "hops" to each node during runtime in col. 15 lines 53-60); and

selecting a gateway CCA based upon the message from each CCA-capable node (i.e., a network leader is chosen based on metric in col. 14 lines 48-56; and the metric of hops is applied to calculating a gravitational center of a network in col. 14 lines 61-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 17, Corson further teaches the act of associating the plurality of nodes further comprises an act of associating the plurality of nodes in an ad-hoc manner (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10). Therefore, the limitations of claim 17 are rejected in the analysis of claim 1 above, and the claim is rejected on that basis.

With respect to claim 18, Corson further teaches an act of providing at least a portion of the plurality of nodes and CCA-capable nodes that are able to be mobile (i.e., mobile routers and mobile nodes on page 65 right column lines 6-14 and fig. 2).

Therefore, the limitations of claim 18 are rejected in the analysis of claim 1 above, and the claim is rejected on that basis.

With respect to claim 19, Corson teaches a network comprising:

a plurality of nodes, each of said plurality of nodes capable of sending and receiving data, the plurality of nodes forming a first sub-network (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10); and

a plurality of cross layer communication agent capable nodes, herein referred to as CCA-capable nodes, at least one of said plurality of CCA-capable nodes capable of communicating with the plurality of nodes and capable of communicating with a second sub-network (i.e., mobile router interfaces with a fixed router from a fixed network and facilitates routing of communication between mobile nodes on page 65 right column lines 6-14 and fig. 2), wherein

a gateway CCA is used by a plurality of nodes and CCA-capable nodes to communicate with the second sub-network (i.e., a mobile router interfaces with a fixed router from a fixed network and facilitates routing of communication between mobile nodes on page 65 right column lines 6-14 and fig. 2).

Corson does not teach determining an assignment for a gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches

> the plurality of nodes and the plurality of CCA-capable nodes communicate to determine which CCA-capable node should be assigned to be a gateway CCA (i.e., determining which node in a subnetwork is available to become a subnetwork leader in col. 9 lines 16-18), whereby the gateway CCA is used by each one of the plurality of nodes and the remaining CCA-capable nodes (i.e., only one subnetwork leader in a subnetwork receiving and processing messages from nodes on col. 9 lines 29-31) to communicate (i.e., maintaining reachability of nodes for multicast communications in col. 4 lines 39-44).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 20, Corson does not teach designating. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network further comprising:

a designation message for designating one of the plurality of CCA-capable nodes as the gateway CCA (i.e., send a message to the group asserting subnetwork leader status in col. 10 lines 65-67);

a querying message sent from each node to the gateway CCA to determine whether the gateway CCA is active (i.e., beacon messages are sent to the subnetwork leader in col. 9 lines 26-31; the node can expect a master list message from the subnetwork leader node as response, which indicates it is active and also listening for beacon messages in col. 10 lines 37-41);

a timeout period where each node waits for a response from the gateway CCA (i.e., beacon node determines whether it has heard from the subnetwork leader within some interval in col. 10 lines 41-43), and when:

the gateway CCA responds, a second querying message is sent (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response, sends master list messages in col. 10 lines 43-47); otherwise,

a solicit message is sent to the plurality of CCA-capable nodes (i.e., nodes can negotiate an election of a new leader by exchanging beacon messages with each other in col. 9 lines 18-22), and when:

a CCA-capable node responds, an assignment instruction block assigns the CCA-capable node as the gateway CCA (i.e., a node can respond by asserting its subnetwork leader status in col. 10 lines 65-67); otherwise,

a second solicit message is sent (i.e., the beacon nodes exchange messages with other nodes continually in col. 11 lines 20-28).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 21, Corson does not teach responding to a solicit message and choosing a leader from the recipients. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network, wherein when a plurality of CCA-capable nodes respond to the solicit message, the assignment instruction block selects a single CCA-capable node from the plurality of CCA-capable nodes responding to the solicit message, for use by all of the nodes as the gateway CCA (i.e., only one node in a subnetwork is tasked with the leader role in normal operation; the leader is elected in response to the exchange of beacon messages amongst nodes in col. 9 lines 27-31). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 22, Corson does not teach determining a network ID and selecting a gateway CCA as the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network, wherein the assignment instruction block comprises:

a determination instruction block for determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 23, Corson does not teach querying a plurality of CCA-capable nodes and assigning a CCA-capable node as a gateway. Novaes, in order to

elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network further comprising:

a designation message for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., send a message to the group asserting subnetwork leader status in col. 10 lines 65-67);

a query message sent from each node for querying the plurality of CCA-capable nodes to determine whether they are active (i.e., beacon messages are exchanged as nodes and these nodes can expect beacon messages in response from an active node; with the beacon messages the nodes negotiate which will become a subnetwork leader in col. 9 lines 18-25);

a timeout period where each node waits for a response from each of the plurality of CCA-capable nodes (i.e., there is a stabilization period during an election of a subnetwork leader before a node sends a message asserting its leader status in col. 19 lines 63-67);

a gateway CCA response message, whereby when a gateway CCA response message is received, a second query message is sent (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response sends master list messages in col. 10 lines 43-47) and

if no gateway CCA response message is received (i.e., if a beacon node does not hear from a subnetwork leader within some interval, an

election is proposed in col. 10 lines 41-43) an assignment instruction block changes the CCA-capable node assigned to be the gateway CCA based upon a response from the plurality of CCA-capable nodes (i.e., a node can respond by asserting its subnetwork leader status after an election is performed in col. 10 lines 60-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 24, Corson does not teach selecting a single CCA-capable node from a plurality of CCA-capable nodes. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network, when a plurality of CCA-capable nodes respond to the query message, the assignment instruction block selects a single CCA-capable node from the plurality of CCA-capable nodes responding to the solicit message, for use by all of the nodes as the gateway CCA (i.e., after the exchange of election messages, one node will respond with a message asserting its subnetwork leader status in col. 10 lines 60-67). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 25, Corson does not teach determining a network ID and choosing a CCA-capable node with the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network, wherein the assignment instruction block comprises:

a determination instruction block for determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 26, Corson does not teach compiling or updating a list of CCA-capable nodes for selecting a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network of further comprising:

a designation message for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., send a message to the group asserting subnetwork leader status in col. 10 lines 65-67);

a compiling instruction block for compiling a list of CCA-capable nodes on at least one CCA-capable node of the plurality of CCA-capable nodes (i.e., compiling a master list or host address list in col. 13 lines 62-64; and host address list contains identifications of subnetwork leaders in col. 6 lines 9-12);

a query message sent from the at least one CCA-capable node for querying each CCA-capable node in the list to determine its state (i.e., using a host address list to periodically query the reachability of subnetwork leaders in col. 18 lines 30-33), whereby

the compiling instruction block updates the list of CCA-capable nodes based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64); and

checks for a response from the gateway CCA (i.e., monitor the health of a tier leader in step 1220 of fig. 12), and when

the gateway CCA responds, a second query message is sent (i.e., monitoring the health of a tier leader leads back to step 1208 in fig. 12); otherwise,

a transmitting instruction block transmits the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67); and

a selecting and assigning instruction block in each node selects and assigns a new gateway CCA from the list of CCA-capable nodes (i.e., if all nodes are capable of being a gateway CCA, the configuration file is a list of all these nodes such that a network leader is elected amongst them in col. 14 lines 52-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 27, Corson does not teach selecting a CCA-capable node having the lowest determined network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network, wherein the selecting and assigning instruction block comprises:

a determination instruction block for determining a network ID for each of the CCA-capable nodes in the list of CCA-capable nodes (i.e., IP addresses are determined in a configuration file in col. 14 table 14); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 28, Corson does not teach querying or updating a list in order to select a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network further comprising:

a designation instruction block, on at least one CCA-capable node of the plurality of CCA-capable nodes, for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., election of a network leader in col. 14 lines 48-56);

a query message sent from at least one CCA-capable node of the plurality of CCA-capable nodes for querying each CCA-capable node in the

plurality of CCA-capable nodes to determine its state (i.e., querying other subnetwork leaders until all reachable subnetwork leaders have been queried in col. 15 lines 6-14);

a compiling instruction block, on the at least one CCA-capable node, for compiling a list of CCA-capable nodes based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64);

a sending instruction block, on the at least one CCA-capable node, for sending the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67); and

a checking instruction block, on the plurality of nodes, for checking the list of CCA-capable nodes for the gateway CCA (i.e., querying other subnetwork leaders for a network leader in col. 15 lines 6-14; subnetwork leaders are multicast reachable from the list of nodes in col. 13 lines 44-48), whereby when

the gateway CCA is in the list of CCA-capable nodes the node waits for the next list of CCA-capable nodes (i.e., network leader can expect to receive subnetwork list messages from subnetwork leaders in col. 13 lines 59-64); otherwise,

a selecting and assigning instruction block in each node selects and assigns a new gateway CCA from the list of CCA-capable nodes (i.e., if all the nodes in a list are capable of being a gateway, electing a new network leader from one of the nodes in a configuration file in col. 14 lines 48-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 29, Corson does not teach determining a network ID and then selecting, as the gateway CCA, the one with the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network, wherein the selecting and assigning instruction block comprises:

a determination instruction block for determining a network ID for each of CCA-capable nodes in the list of CCA-capable nodes (i.e., IP addresses are determined in a configuration file in col. 14 table 14); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest

address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 30, Corson does not teach designating only one of a plurality of capable nodes to be a gateway, broadcasting a message or selecting a gateway based on the broadcasted message. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network further comprising:

a designation instruction block in each of the CCA-capable nodes for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., electing a network leader by calculating a gravitational weight in col. 14 lines 48-56);

a broadcast message sent from each CCA-capable node to the plurality of nodes (i.e., IP trace routing messages sent to calculate the number of "hops" to each node during runtime in col. 15 lines 53-60); and

a selecting instruction block in each of the CCA-capable nodes for selecting a gateway CCA based upon a received active message from each CCA-capable node (i.e., a network leader is chosen based on metric in col. 14 lines 48-56; and the metric of hops is applied to calculating a gravitational center of a network in col. 14 lines 61-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 35, Corson further teaches a network is an ad-hoc network (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10). Therefore, the limitations of claim 35 are rejected in the analysis of claim 19 above, and the claim is rejected on that basis.

With respect to claim 36, Corson further teaches at least a portion of the plurality of nodes and CCA-capable nodes are mobile (i.e., mobile routers and mobile nodes on page 65 right column lines 6-14 and fig. 2). Therefore, the limitations of claim 36 are rejected in the analysis of claim 19 above, and the claim is rejected on that basis.

With respect to claim 37, the limitations of claim 37 are similar to the limitations of claim 1. Therefore, claim 37 is rejected with the same reasoning as claim 1.

With respect to claim 38, the limitations of claim 38 are similar to the limitations of claim 2. Therefore, claim 38 is rejected with the same reasoning as claim 2.

With respect to claim 39, the limitations of claim 39 are similar to the limitations of claim 3. Therefore, claim 39 is rejected with the same reasoning as claim 3.

With respect to claim 40, the limitations of claim 40 are similar to the limitations of claim 4. Therefore, claim 40 is rejected with the same reasoning as claim 4.

With respect to claim 41, the limitations of claim 41 are similar to the limitations of claim 5. Therefore, claim 41 is rejected with the same reasoning as claim 5.

With respect to claim 42, the limitations of claim 42 are similar to the limitations of claim 6. Therefore, claim 42 is rejected with the same reasoning as claim 6.

With respect to claim 43, the limitations of claim 43 are similar to the limitations of claim 7. Therefore, claim 43 is rejected with the same reasoning as claim 7.

With respect to claim 44, the limitations of claim 44 are similar to the limitations of claim 8. Therefore, claim 44 is rejected with the same reasoning as claim 8.

With respect to claim 45, the limitations of claim 45 are similar to the limitations of claim 9. Therefore, claim 45 is rejected with the same reasoning as claim 9.

With respect to claim 46, the limitations of claim 46 are similar to the limitations of claim 10. Therefore, claim 46 is rejected with the same reasoning as claim 10.

With respect to claim 47, the limitations of claim 47 are similar to the limitations of claim 11. Therefore, claim 47 is rejected with the same reasoning as claim 11.

With respect to claim 48, the limitations of claim 44 are similar to the limitations of claim 12. Therefore, claim 48 is rejected with the same reasoning as claim 12.

With respect to claim 53, the limitations of claim 53 are similar to the limitations of claim 17. Therefore, claim 53 is rejected with the same reasoning as claim 17.

With respect to claim 54, the limitations of claim 54 are similar to the limitations of claim 18. Therefore, claim 54 is rejected with the same reasoning as claim 18.

With respect to claim 55, Corson teaches a method for network communications, the method comprising the actions of

> associating a node with a sub-network, the node capable of sending data to and receiving data from a plurality of CCA-capable nodes (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10).

Corson does not teach determining an assignment for a gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches

> determining which one of the plurality of CCA-capable nodes should be assigned to be a gateway CCA (i.e., determining which node in a subnetwork is available to become a subnetwork leader in col. 9 lines 16-18), whereby said gateway CCA is used by the node within

said sub-network (i.e., only one subnetwork leader in a subnetwork receiving and processing messages from nodes on col. 9 lines 29-31) to communicate with the rest of the network (i.e., maintaining reachability of nodes for multicast communications in col. 4 lines 39-44).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 56, Corson does not teach querying a gateway CCA or assigning a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the node further performs the acts of:

designating one of the plurality of CCA-capable nodes as the gateway CCA (i.e., determine an available node can become a subnetwork leader based on it having the highest or lowest network address in col. 9 lines 13-18);

querying the gateway CCA from each node to determine whether it is active and awaiting a response (i.e., beacon messages are sent to the subnetwork leader in col. 9 lines 26-31; the node can expect a

master list message from the subnetwork leader node as response, which indicates it is active and also listening for beacon messages in col. 10 lines 37-41), and when:

the gateway CCA responds, repeating the querying act (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response, sends master list messages in col. 10 lines 43-47); otherwise,

broadcasting a solicit message for receipt by CCA-capable nodes and awaiting a response (i.e., nodes can negotiate an election of a new leader by exchanging beacon messages with each other in col. 9 lines 18-22), and when:

a CCA-capable node responds, assigning a CCA-capable node as the gateway CCA (i.e., a node can respond by asserting its subnetwork leader status in col. 10 lines 65-67); otherwise,

repeating the broadcasting act (i.e., the beacon nodes exchange messages with other nodes continually in col. 11 lines 20-28).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 57, Corson does not teach selecting a single CCA-capable node as the gateway for all nodes. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein when a plurality of CCA-capable nodes respond, selecting from the plurality of CCA-capable nodes responding, a single CCA-capable node for use by all of the nodes as the gateway CCA (i.e., only one node in a subnetwork is tasked with the leader role in normal operation in col. 9 lines 19-23). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 58, Corson does not teach a network ID or selecting a gateway based on it having the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the act of selecting from the plurality of CCA-capable nodes responding comprises acts of:

determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway

CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 59, Corson does not teach querying a CCA-capable node for activity or changing a gateway CCA assignment. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method wherein said act of determining further comprises acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., determine an available node that can become a subnetwork leader based on it having the highest or lowest network address in col. 9 lines 13-18);

querying the plurality of CCA-capable nodes to determine whether they are active and awaiting a response (i.e., beacon messages are sent to the subnetwork leader in col. 9 lines 26-31; the node can expect a master list message from the subnetwork leader node indicating it is active and also listening for beacon messages in col. 10 lines 37-41), and when:

the gateway CCA responds, repeating the querying act (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response sends master list messages in col. 10 lines 43-47); otherwise,

changing the CCA-capable node assigned to be the gateway CCA based upon a response from the plurality of CCA-capable nodes (i.e., a node can respond by asserting its subnetwork leader status in col. 10 lines 65-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 60, Corson does not teach selecting a single gateway CCA for use by all the nodes in a subnetwork. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches when a plurality of CCA-capable nodes respond, selecting from the plurality of CCA-capable nodes responding, a single CCA-capable node for use by all of the nodes as the gateway CCA (i.e., only one node in a subnetwork is tasked with the leader role in normal operation in col. 9 lines 19-23). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was

made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 61, Corson does not teach determining a network ID and selecting a gateway based on the network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of selecting from the plurality of CCA-capable nodes responding comprises acts of:

determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 62, Corson further teaches the act of associating a node further comprises an act of associating the node in an ad-hoc manner (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on

page 64 left column lines 1-10). Therefore, the limitations of claim 62 are rejected in the analysis of claim 55 above, and the claim is rejected on that basis.

With respect to claim 63, Corson further teaches an act of providing a node capable of being mobile (i.e., mobile routers and mobile nodes on page 65 right column lines 6-14 and fig. 2). Therefore, the limitations of claim 63 are rejected in the analysis of claim 55 above, and the claim is rejected on that basis.

With respect to claim 64, Corson teaches a node comprising:

a transmitting and receiving instruction block for communicating with a sub-network (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10), the sub-network comprising of nodes and a plurality of cross layer communication agent capable nodes, herein referred to as CCA-capable nodes (i.e., mobile routers interface with a fixed router from a fixed network and also facilitate routing of communication between mobile nodes on page 65 right column lines 6-14 and fig. 2); and

the gateway CCA is used by the node to communicate with a second sub-network (i.e., a mobile node is connected to a mobile router which interfaces with a fixed router from a fixed network on page 65 right column lines 6-14 and fig. 2).

Corson does not teach determining an assignment for a gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches:

> a determination instruction block for the node to determine which CCA-capable node should be assigned to be a gateway CCA (i.e., determining which node in a subnetwork is available to become a subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 65, Corson does not teach designating. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the node, wherein the determination instruction block further comprises:

> a designation instruction block for designating one of the plurality of CCA-capable nodes as the gateway CCA (i.e., determine an available node can become a subnetwork leader based on it having the highest or lowest network address in col. 9 lines 13-18);
>
> a querying message sent to the gateway CCA to determine whether the gateway CCA is active (i.e., beacon messages are sent to the subnetwork leader in col. 9 lines 26-31; the node can expect a

master list message from the subnetwork leader node as response, which indicates it is active and also listening for beacon messages in col. 10 lines 37-41);

a timeout period where the node waits for a response from the gateway CCA (i.e., beacon node determines whether it has heard from the subnetwork leader within some interval in col. 10 lines 41-43), and when:

the gateway CCA responds, a second querying message is sent (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response, sends master list messages in col. 10 lines 43-47); otherwise,

a solicit message is sent to the plurality of CCA-capable nodes (i.e., nodes can negotiate an election of a new leader by exchanging beacon messages with each other in col. 9 lines 18-22), and when:

a CCA-capable node responds, an assignment instruction block assigns the CCA-capable node as the gateway CCA (i.e., a node can respond by asserting its subnetwork leader status in col. 10 lines 65-67); otherwise,

a second solicit message is sent (i.e., the beacon nodes exchange messages with other nodes continually in col. 11 lines 20-28).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 66, Corson does not teach responding to a solicit message and choosing a leader from the recipients. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the node, wherein when a plurality of CCA-capable nodes respond to the solicit message, the assignment instruction block selects a single CCA-capable node from the plurality of CCA-capable nodes responding to the solicit message, for use by the node as the gateway CCA (i.e., only one node in a subnetwork is tasked with the leader role in normal operation; the leader is elected in response to the exchange of beacon messages amongst nodes in col. 9 lines 27-31). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 67, Corson does not teach determining a network ID and selecting a gateway CCA as the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the node, wherein the assignment instruction block comprises:

a determination instruction block for determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 68, Corson does not teach querying a plurality of CCA-capable nodes and assigning a CCA-capable node as a gateway. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the node, wherein the determination instruction block further comprises:

a designation message for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., send a message to the group asserting subnetwork leader status in col. 10 lines 65-67);

a query message for querying the plurality of CCA-capable nodes to determine whether they are active (i.e., beacon messages are exchanged as nodes and these nodes can expect beacon messages in response from an active node; with the beacon messages the nodes negotiate which will become a subnetwork leader in col. 9 lines 18-25);

a timeout period where the node waits for a response from each of the plurality of CCA-capable nodes (i.e., there is a stabilization period during an election of a subnetwork leader before a node sends a message asserting its leader status in col. 19 lines 63-67);

a gateway CCA response message, whereby when a gateway CCA response message is received, a second query message is sent (i.e., the subnetwork leader continues to listen for and expect beacon messages and in response sends master list messages in col. 10 lines 43-47) and

if no gateway CCA response message is received (i.e., if a beacon node does not hear from a subnetwork leader within some interval, an election is proposed in col. 10 lines 41-43) an assignment instruction block changes the CCA-capable node assigned to be

the gateway CCA based upon a response from the plurality of CCA-capable nodes (i.e., a node can respond by asserting its subnetwork leader status after an election is performed in col. 10 lines 60-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 69, Corson does not teach selecting a single CCA-capable node from a plurality of CCA-capable nodes. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the node, when a plurality of CCA-capable nodes respond to the query message, the assignment instruction block selects a single CCA-capable node from the plurality of CCA-capable nodes responding to the solicit message, for use by the node as the gateway CCA (i.e., after the exchange of election messages, one node will respond with a message asserting its subnetwork leader status in col. 10 lines 60-67). Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 70, Corson does not teach determining a network ID and choosing a CCA-capable node with the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the node, wherein the assignment instruction block comprises:

a determination instruction block for determining a network ID for each of the plurality of CCA-capable nodes responding (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from each of the plurality of CCA-capable nodes responding as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 71, the limitations of claim 71 are similar to the limitations of claim 55. Therefore, claim 71 is rejected with the same reasoning as claim 55.

With respect to claim 72, the limitations of claim 72 are similar to the limitations of claim 56. Therefore, claim 72 is rejected with the same reasoning as claim 56.

With respect to claim 73, the limitations of claim 73 are similar to the limitations of claim 57. Therefore, claim 73 is rejected with the same reasoning as claim 57.

With respect to claim 74, the limitations of claim 74 are similar to the limitations of claim 58. Therefore, claim 74 is rejected with the same reasoning as claim 58.

With respect to claim 75, the limitations of claim 75 are similar to the limitations of claim 59. Therefore, claim 75 is rejected with the same reasoning as claim 59.

With respect to claim 76, the limitations of claim 76 are similar to the limitations of claim 60. Therefore, claim 76 is rejected with the same reasoning as claim 60.

With respect to claim 77, the limitations of claim 77 are similar to the limitations of claim 61. Therefore, claim 77 is rejected with the same reasoning as claim 61.

With respect to claim 78, Corson teaches a method for network communications, the method comprising the act of

associating a CCA-capable node with a sub-network, the sub-network comprising a plurality of CCA-capable nodes, the CCA-capable node capable of sending and receiving data to and from nodes within the sub-network (i.e., mobile router interfaces with a fixed router from a fixed network and facilitates routing of communication between mobile nodes on page 65 right column lines 6-14 and fig. 2).

Corson does not teach determining an assignment for a gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches

> determining if the CCA-capable node should be assigned to be a gateway CCA (i.e., determining which node in a subnetwork is available to become a subnetwork leader in col. 9 lines 16-18), whereby said gateway CCA is used by the nodes within the sub-network (i.e., only one subnetwork leader in a subnetwork receiving and processing messages from nodes on col. 9 lines 29-31) to communicate with the rest of the network (i.e., maintaining reachability of nodes for multicast communications in col. 4 lines 39-44).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 79, Corson does not teach compiling or updating a list of CCA-capable nodes or selecting a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein said act of determining further comprises acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., election of a subnetwork leader to become a network leader in col. 14 lines 48-56);

compiling a list of CCA-capable nodes on at least on CCA-capable node of the plurality of CCA-capable nodes (i.e., compiling a master list or host address list in col. 13 lines 62-64; and host address list contains identifications of subnetwork leaders in col. 6 lines 9-12);

querying each CCA-capable node, from the at least one CCA-capable node, in the list to determine its state (i.e., using a host address list to periodically query the reachability of subnetwork leaders in col. 18 lines 30-33);

updating the list of CCA-capable nodes based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64); and

checking for a response from the gateway CCA (i.e., monitor the health of a tier leader in step 1220 of fig. 12), and when:

the gateway CCA responds, repeating the querying act (i.e., monitoring the health of a tier leader leads back to step 1208 in fig. 12); otherwise,

transmitting the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67); and

selecting and assigning a new gateway CCA from the list of CCA-capable nodes (i.e., if all nodes are capable of being a gateway CCA, the configuration file is a list of all these nodes such that a network leader is elected amongst them in col. 14 lines 52-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 80, Corson does not teach selecting a CCA-capable node having the lowest determined network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the act of selecting and assigning a new gateway CCA comprises acts of:

determining a network ID for each of the CCA-capable nodes in the list of CCA-capable nodes (i.e., IP addresses are determined in a configuration file in col. 14 table 14); and

selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 81, Corson does not teach querying or updating a list in order to select a new gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the act of determining further comprises acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., election of a network leader in col. 14 lines 48-56);

querying each CCA-capable node, from at least one CCA-capable node in the plurality of CCA-capable nodes, in the plurality of CCA-capable nodes to determine its state (i.e., querying other subnetwork leaders until all reachable subnetwork leaders have been queried in col. 15 lines 6-14);

updating a list of CCA-capable nodes, stored on the at least on CCA-capable node, based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64);

sending, from the at least one CCA-capable node, the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67);

waiting to repeat the querying act (i.e., periodically monitoring the reachability of a subnetwork leader in col. 18 lines 32-33); and

checking, by at least one node in the plurality of nodes, the list of CCA-capable nodes for the gateway CCA (i.e., querying other subnetwork leaders for a network leader in col. 15 lines 6-14; subnetwork leaders are multicast reachable from the list of nodes in col. 13 lines 44-48), and when:

the gateway CCA is in the list of CCA-capable nodes waiting for the next list of CCA-capable nodes (i.e., the confirmed network leader expects to receive subnetwork list messages from subnetwork leaders in col. 13 lines 59-64); otherwise,

selecting and assigning a new gateway CCA from the list of CCA-capable nodes (i.e., if all the nodes in a list are capable of

being a gateway CCA, electing a new network leader from one of the nodes in a configuration file in col. 14 lines 48-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 82, Corson does not teach determining a network ID and then selecting, as the gateway CCA, the one with the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the act of selecting and assigning from the list of CCA-capable nodes comprises acts of:

determining a network ID for each of CCA-capable nodes in the list of CCA-capable nodes (i.e., IP addresses are determined in a configuration file in col. 14 table 14); and

selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 83, Corson does not teach designating only one of a plurality of capable nodes to be a gateway, broadcasting a message or selecting a gateway based on the broadcasted message. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the act of determining further comprises acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., electing a network leader by calculating a gravitational weight in col. 14 lines 48-56);

broadcasting a message from each CCA-capable node to the plurality of nodes (i.e., IP trace routing messages sent to calculate the number of "hops" to each node during runtime in col. 15 lines 53-60); and

selecting a gateway CCA based upon the message from each CCA-capable node (i.e., a network leader is chosen based on metric in col. 14 lines 48-56; and the metric of hops is applied to calculating a gravitational center of a network in col. 14 lines 61-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to

improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 88, Corson teaches a CCA-capable node comprising:

a first transmitting and receiving instruction block for communicating with a sub-network (i.e., nodes with wireless transmitters and receivers have wireless connectivity in an ad hoc network on page 64 left column lines 1-10), the CCA-capable node capable of sending data to and receiving data from nodes within the sub-network (i.e., mobile router interfaces with a fixed router from a fixed network and facilitates routing of communication between mobile nodes on page 65 right column lines 6-14 and fig. 2); and

Corson does not teach determining an assignment for a gateway CCA. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches

a determination instruction block for determining if the CCA-capable node should be assigned to be a gateway CCA (i.e., determining which node in a subnetwork is available to become a subnetwork leader in col. 9 lines 16-18), whereby said gateway CCA is used by the nodes within the sub-network (i.e., only one subnetwork leader in a subnetwork receiving and processing messages from nodes on col. 9 lines 29-31) to communicate with the rest of the network (i.e.,

maintaining reachability of nodes for multicast communications in col. 4 lines 39-44).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 89, Corson does not teach designating. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node, wherein the determination instruction block further comprises:

a designation message for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., sending a master list message which only the network leader can send in col. 13 lines 61-63);

a compiling instruction block for compiling a list of CCA-capable nodes (i.e., compiling a master list or host address list in col. 13 lines 62-64; and host address list contains identifications of subnetwork leaders in col. 6 lines 9-12);

a query message sent from the CCA-capable node for querying each CCA-capable node in the list to determine its state (i.e., using a host address list to periodically query the reachability of subnetwork leaders in col. 18 lines 30-33), whereby

the compiling instruction block updates the list of CCA-capable nodes based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64), and

checks for a response from the gateway CCA (i.e., monitor the health of a tier leader in step 1220 of fig. 12), and when

the gateway CCA responds, a second query message is sent (i.e., monitoring the health of a tier leader leads back to step 1208 in fig. 12); otherwise,

a transmitting instruction block transmits the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67); and

a selecting and assigning instruction block in each node selects and assigns a new gateway CCA from the list of CCA-capable nodes (i.e., if all nodes are capable of being a gateway CCA, the configuration file is a list of all these nodes such that a network leader is elected amongst them in col. 14 lines 52-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to

improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 90, Corson does not teach a network ID or selecting a gateway based on it having the lowest network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node, wherein the selecting and assigning instruction block comprises:

a determination instruction block for determining a network ID for each of the CCA-capable nodes in the list of CCA-capable nodes (i.e., analyze the IP address, of each node, for being the lowest in the subnetwork in col. 9 lines 16-18 and see col. 14 table 1); and a

selecting instruction block for selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 91, Corson does not teach querying or updating a list in order to select a new gateway CCA. Novaes, in order to elect a new subnetwork leader

for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node further comprising:

a designation instruction block for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., election of a network leader in col. 14 lines 48-56);

a query message sent from the CCA-capable node for querying each CCA-capable node in the plurality of CCA-capable nodes to determine its state (i.e., querying other subnetwork leaders until all reachable subnetwork leaders have been queried in col. 15 lines 6-14);

a compiling instruction block for compiling a list of CCA-capable nodes based on a response from each of the CCA-capable nodes (i.e., after receiving a periodic subnetwork list message, the network leader compiles the master list whenever it receives a periodic message from subnetwork leaders in col. 13 lines 59-64);

a sending instruction block for sending the list of CCA-capable nodes to the plurality of nodes in the sub-network (i.e., subnetwork leaders propagate the master list to all the nodes in their networks in col. 13 lines 65-67); and

a checking instruction block for checking the list of CCA-capable nodes for the gateway CCA (i.e., querying other subnetwork leaders for a network leader in col. 15 lines 6-14; subnetwork leaders are

multicast reachable from the list of nodes in col. 13 lines 44-48), whereby when

the gateway CCA is in the list of CCA-capable nodes the node waits for the next list of CCA-capable nodes (i.e., network leader can expect to receive subnetwork list messages from subnetwork leaders in col. 13 lines 59-64); otherwise,

a selecting and assigning instruction block in each node selects and assigns a new gateway CCA from the list of CCA-capable nodes (i.e., if all the nodes in a list are capable of being a gateway, electing a new network leader from one of the nodes in a configuration file in col. 14 lines 48-56 and table 1).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 92, Corson does not teach selecting a CCA-capable node having the lowest determined network ID. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node, wherein the selecting and assigning instruction block comprises:

a determination instruction block for determining a network ID for each of CCA-capable nodes in the list of CCA-capable nodes (i.e., IP

addresses are determined in a configuration file in col. 14 table 14); and

a selecting instruction block for selecting a CCA-capable node having a lowest network ID from the list of CCA-capable nodes as the gateway CCA (i.e., determine if the address with the lowest address can become the subnetwork leader in col. 9 lines 16-18; the same choice of lowest network ID can be applied in substitution to the highest network ID parameter for the network leader election process in col. 14 lines 48-56).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 93, Corson does not teach designating only one of a plurality of capable nodes to be a gateway, broadcasting a message or selecting a gateway based on the broadcasted message. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node further comprising:

a designation instruction block for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., electing a network leader by calculating a gravitational weight in col. 14 lines 48-56);

a broadcast message sent from the CCA-capable node to the plurality of nodes (i.e., IP trace routing messages sent to calculate the number of "hops" to each node during runtime in col. 15 lines 53-60); and

a selecting instruction block for selecting a gateway CCA based upon a received active message from each CCA-capable node (i.e., a network leader is chosen based on metric in col. 14 lines 48-56; and the metric of hops is applied to calculating a gravitational center of a network in col. 14 lines 61-67).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 98, the limitations of claim 98 are similar to the limitations of claim 78. Therefore, claim 98 is rejected with the same reasoning as claim 78.

With respect to claim 99, the limitations of claim 99 are similar to the limitations of claim 79. Therefore, claim 99 is rejected with the same reasoning as claim 79.

With respect to claim 100, the limitations of claim 100 are similar to the limitations of claim 80. Therefore, claim 100 is rejected with the same reasoning as claim 80.

With respect to claim 101, the limitations of claim 101 are similar to the limitations of claim 81. Therefore, claim 101 is rejected with the same reasoning as claim 81.

With respect to claim 102, the limitations of claim 102 are similar to the limitations of claim 82. Therefore, claim 102 is rejected with the same reasoning as claim 82.

With respect to claim 103, the limitations of claim 103 are similar to the limitations of claim 83. Therefore, claim 103 is rejected with the same reasoning as claim 83.

8. Claims 13, 31, 49, 84, 94, and 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corson et al. ("Internet-Based Mobile Ad Hoc Networking", IEEE Internet Computing, July-August 1999, pages 63-70) in view of Novaes (US Patent No. 6,732,189 B1), and further in view of Chari et al. (US Application No. 2002/0107023 A1).

With respect to claim 13, Corson does not teach determining or comparing hop-counts. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the act of selecting further comprising acts of:

> determining a current hop-count for the message (i.e., IP trace routing facility used to calculate the number of "hops" during runtime in col. 15 lines 53-60).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach comparing hop-counts to previous ones for selecting a new gateway. Chari, in order for wireless clients to receive a beacon and know the way to reach a server (see section 8 lines 5-6), teaches comparing the current hop-count to previous hop-counts from previous messages (i.e., comparing the number of hops between a client and server in section 98 lines 1-3), and when the current hop-count is less than the previous hop-count selecting the CCA-capable node which broadcast the message as a new gateway CCA (i.e., optimal path to a server maybe chosen based on preset criteria such as number of hops determined from previous beacon messages to a server in section 99 lines 1-2 and 13-15). Based on Corson in view of Novaes, and further in view of Chari, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Chari to improve upon those of Corson in order for wireless clients to receive a beacon and know the way to reach a server.

With respect to claim 31, Corson does not teach determining or comparing hop-counts. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network wherein the selecting instruction block comprises:

> a hop-count determination instruction block for determining a current hop-count for the message (i.e., IP trace routing facility used to calculate the number of "hops" during runtime in col. 15 lines 53-60).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach comparing hop-counts to previous ones for selecting a new gateway. Chari, in order for wireless clients to receive a beacon and know the way to reach a server (see section 8 lines 5-6), teaches a comparing instruction block for comparing the current hop-count to previous hop-counts from previous messages (i.e., comparing the number of hops between a client and server in section 98 lines 1-3), and when the current hop-count is less than the previous hop-count selecting the CCA-capable node which broadcast the message as a new gateway CCA (i.e., optimal path to a server maybe chosen based on preset criteria such as number of hops determined from previous beacon messages to a server in section 99 lines 1-2 and 13-15). Based on Corson in view of Novaes, and further in view of Chari, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Chari to improve upon those of Corson in order for wireless clients to receive a beacon and know the way to reach a server.

With respect to claim 49, the limitations of claim 49 are similar to the limitations of claim 13. Therefore, claim 49 is rejected with the same reasoning as claim 13.

With respect to claim 84, Corson does not teach determining or comparing hop-counts. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein the act of selecting further comprises acts of:

> determining a current hop-count for the message (i.e., IP trace routing facility used to calculate the number of "hops" during runtime in col. 15 lines 53-60).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach comparing hop-counts to previous ones for selecting a new gateway. Chari, in order for wireless clients to receive a beacon and know the way to reach a server (see section 8 lines 5-6), teaches comparing the current hop-count to previous hop-counts from previous messages (i.e., comparing the number of hops between a client and server in section 98 lines 1-3), and when the current hop-count is less than the previous hop-count selecting the CCA-capable node which broadcast the message as a new gateway CCA (i.e., optimal path to a server maybe chosen based on preset criteria such as number of hops determined from previous beacon messages to a server in section 99 lines 1-2 and 13-15). Based on Corson in view of Novaes, and further in view of Chari, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of

Chari to improve upon those of Corson in order for wireless clients to receive a beacon and know the way to reach a server.

With respect to claim 94, Corson does not teach determining or comparing hop-counts. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node, wherein the selecting instruction block comprises:

> a hop-count determination instruction block for determining a current hop-count for the message (i.e., IP trace routing facility used to calculate the number of "hops" during runtime in col. 15 lines 53-60).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach comparing hop-counts to previous ones for selecting a new gateway. Chari, in order for wireless clients to receive a beacon and know the way to reach a server (see section 8 lines 5-6), teaches a comparing instruction block for comparing the current hop-count to previous hop-counts from previous messages (i.e., comparing the number of hops between a client and server in section 98 lines 1-3), and when the current hop-count is less than the previous hop-count selecting the CCA-capable node which broadcast the message as a new gateway

CCA (i.e., optimal path to a server maybe chosen based on preset criteria such as number of hops determined from previous beacon messages to a server in section 99 lines 1-2 and 13-15). Based on Corson in view of Novaes, and further in view of Chari, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Chari to improve upon those of Corson in order for wireless clients to receive a beacon and know the way to reach a server.

With respect to claim 104, the limitations of claim 104 are similar to the limitations of claim 84. Therefore, claim 104 is rejected with the same reasoning as claim 84.

9. Claims 14, 32, 85, 95 and 105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corson et al. ("Internet-Based Mobile Ad Hoc Networking", IEEE Internet Computing, July-August 1999, pages 63-70) in view of Novaes (US Patent No. 6,732,189 B1), and further in view of Elliott et al. (US Patent No. 6,335,927 B1).

With respect to claim 14, Corson and Novaes do not teach determining or retrieving a gateway time and selecting a new gateway based on a comparison of these times. Elliott, in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information (see col. 1 lines 24-29), teaches the act of selecting further comprising acts of:

determining a current time at which the message was received (i.e., list of gateways pinged can include the current gateway selected in col. 98 lines 33-34);

retrieving a gateway time at which a message from the gateway CCA was received (i.e., IP ping evaluates the time it takes for a message to take a round-trip from the gateway to the client in col. 98 lines 42-44); and

selecting and assigning a new gateway CCA based upon a result of a user-specified formula for comparing the current time and the gateway time (i.e., selecting the best choice for a gateway server in col. 97 lines 64-65; and ranking the pinged gateways in order of lowest latency in col. 98 lines 53-54).

Based on Corson in view of Novaes, and further in view of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Elliott to improve upon those of Corson in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information.

With respect to claim 32, Corson and Novaes do not teach determining or retrieving a gateway time and selecting a new gateway based on a comparison of these times. Elliott, in order to route information through a hybrid network utilizing telephony

routing information and internet protocol address information (see col. 1 lines 24-29), teaches the network, wherein the selecting instruction block comprises:

a current time determination instruction block for determining a current time at which the message was received (i.e., list of gateways pinged can include the current gateway selected in col. 98 lines 33-34);

a retrieving instruction block for retrieving a gateway time at which a message from the gateway CCA was received (i.e., IP ping evaluates the time it takes for a message to take a round-trip from the gateway to the client in col. 98 lines 42-44); and

a selecting and assigning instruction block for selecting and assigning a new gateway CCA based upon a result of a user-specified formula for comparing the current time and the gateway time (i.e., selecting the best choice for a gateway server in col. 97 lines 64-65; and ranking the pinged gateways in order of lowest latency in col. 98 lines 53-54).

Based on Corson in view of Novaes, and further in view of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Elliott to improve upon those of Corson in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information.

With respect to claim 85, Corson and Novaes do not teach determining or retrieving a gateway time and selecting a new gateway based on a comparison of these times. Elliott, in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information (see col. 1 lines 24-29), teaches the method, wherein the act of selecting further comprises acts of:

determining a current time at which the message was received (i.e., list of gateways pinged can include the current gateway selected in col. 98 lines 33-34);

retrieving a gateway time at which a message from the gateway CCA was received (i.e., IP ping evaluates the time it takes for a message to take a round-trip from the gateway to the client in col. 98 lines 42-44); and

selecting and assigning a new gateway CCA based upon a result of a user-specified formula for comparing the current time and the gateway time (i.e., selecting the best choice for a gateway server in col. 97 lines 64-65; and ranking the pinged gateways in order of lowest latency in col. 98 lines 53-54).

Based on Corson in view of Novaes, and further in view of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Elliott to improve upon those of Corson in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information.

With respect to claim 95, Corson and Novaes do not teach determining or retrieving a gateway time and selecting a new gateway based on a comparison of these times. Elliott, in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information (see col. 1 lines 24-29), teaches the CCA-capable node, wherein the selecting instruction block comprises:

a current time determination instruction block for determining a current time at which the message was received (i.e., list of gateways pinged can include the current gateway selected in col. 98 lines 33-34);

a retrieving instruction block for retrieving a gateway time at which a message from the gateway CCA was received (i.e., IP ping evaluates the time it takes for a message to take a round-trip from the gateway to the client in col. 98 lines 42-44); and

a selecting and assigning instruction block for selecting and assigning a new gateway CCA based upon a result of a user-specified formula for comparing the current time and the gateway time (i.e., selecting the best choice for a gateway server in col. 97 lines 64-65; and ranking the pinged gateways in order of lowest latency in col. 98 lines 53-54).

Based on Corson in view of Novaes, and further in view of Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Elliott to improve upon those of Corson in order to route

information through a hybrid network utilizing telephony routing information and internet protocol address information.

With respect to claim 105, the limitations of claim 105 are similar to the limitations of claim 85. Therefore, claim 105 is rejected with the same reasoning as claim 85.

10. Claims 15-16, 33-34, 51-52, 86-87, 96-97, and 106-107 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corson et al. ("Internet-Based Mobile Ad Hoc Networking", IEEE Internet Computing, July-August 1999, pages 63-70) in view of Novaes (US Patent No. 6,732,189 B1), and further in view of Kursawe et al. (US Application No. 2001/0025351 A1) and Lisiecki et al. (US Application 2002/0143888 A1).

With respect to claim 15, Corson does not teach designating a gateway CCA via transmitting votes and tallying them. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches an act of determining further comprising acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., if no network leader is specified, propose an election and choose a network leader with the highest weight in col. 15 lines 14-19).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach a system of voting which elects a new leader. Kursawe, in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system (see section 2 lines 3-6), teaches an act of determining further comprising acts of:

> transmitting a vote from each CCA-capable node to all other CCA-capable nodes designating which CCA-capable node should become a subsequent gateway CCA (i.e., broadcasting a vote to be received by each participating network device in claim 1 first paragraph and section c); and
>
> repeating the transmitting act (i.e., if no agreement is reached broadcast signed vote for use in a fallback agreement in section 67).

Based on Corson in view of Novaes, and further in view of Kursawe, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Kursawe to improve upon those of Corson in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system.

Corson, Novaes, and Kursawe do not teach tallying a set of votes for each candidate designated. Lisiecki, in order to provide fault-tolerance by leader election (see section 20), teaches the act of determining further comprising:

> tallying said votes for each CCA-capable node (i.e., candidates count the number of votes that they receive in section 133 lines 38-41), and when:
>
> one CCA-capable node receives more votes than any of the other CCA-capable nodes, assigning the one CCA-capable node to become the new gateway CCA (i.e., a leader is selected as the first and only one candidate encountered with more than half of the votes in section 133 lines 38-41).

Based on Corson in view of Novaes, and further in view of Kursawe and Lisiecki, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Lisiecki to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 16, Corson and Novaes do not teach determining if whether two-thirds of the entities participating in a vote are active. Kursawe further teaches an act of determining if at least 2/3 (i.e., normal operation requires 2/3 of n participating devices to be honest in claim 2 section i) of the plurality of CCA-capable nodes are active (i.e., failure detector suspects some participant in a group as faulty in section 60 and 66), and wherein at least 2/3 of the CCA-capable nodes must respond before

performing the act of transmitting the vote (i.e., abort the verification protocol where participants send their preliminary decision values to all other participants in section 66). Therefore, the limitations of claim 16 are rejected in the analysis of claim 15 above, and the claim is rejected on that basis.

With respect to claim 33, Corson does not teach designating a gateway CCA via transmitting votes and tallying them. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the network further comprising:

> a designation instruction block in each of the CCA-capable nodes for designating one of the plurality of CCA-capable nodes to be a gateway CCA.

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach a system of voting which elects a new leader. Kursawe, in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system (see section 2 lines 3-6), teaches the network further comprising:

> a transmitting instruction block for transmitting a vote from each CCA-capable node to all other CCA-capable nodes designating which

CCA-capable node should become a subsequent gateway CCA (i.e., broadcasting a vote to be received by each participating network device in claim 1 first paragraph and section c);

the transmitting instruction block transmits a second vote (i.e., if no agreement is reached in the first vote, a broadcasted and signed vote is sent in a fallback agreement protocol in section 67).

Based on Corson in view of Novaes, and further in view of Kursawe, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Kursawe to improve upon those of Corson in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system.

Corson, Novaes, and Kursawe do not teach tallying a set of votes for each candidate designated. Lisiecki, in order to provide fault-tolerance by leader election (see section 20), teaches the network further comprising:

a tallying instruction block in each of the CCA-capable nodes for tallying said votes for each CCA-capable node, whereby when one CCA-capable node receives more votes than any of the other CCA-capable nodes, an assigning instruction block assigns the one CCA-capable node to become the new gateway CCA, otherwise the transmitting instruction block transmits a second vote (i.e., a leader is selected as the first and only

one candidate encountered with more than half of the votes in section 133 lines 38-41).

Based on Corson in view of Novaes, and further in view of Kursawe and Lisiecki, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Lisiecki to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 34, Corson and Novaes do not teach determining if whether two-thirds of the entities participating in a vote are active. Kursawe further teaches the network further comprising a determination instruction block for determining if at least 2/3 (i.e., normal operation requires 2/3 of n participating devices to be honest in claim 2 section i) of the plurality of CCA-capable nodes are active (i.e., failure detector suspects some participant in a group as faulty such in the case of a timeout in section 60 and 66), and wherein at least 2/3 of the CCA-capable nodes must respond before the transmitting instruction block transmits a vote (i.e., abort the verification protocol where participants send their preliminary decision values to all other participants in section 66). Therefore, the limitations of claim 34 are rejected in the analysis of claim 33 above, and the claim is rejected on that basis.

With respect to claim 51, the limitations of claim 51 are similar to the limitations of claim 15. Therefore, claim 51 is rejected with the same reasoning as claim 15.

With respect to claim 52, the limitations of claim 52 are similar to the limitations of claim 16. Therefore, claim 52 is rejected with the same reasoning as claim 16.

With respect to claim 86, Corson does not teach designating a gateway CCA via transmitting votes and tallying them. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the method, wherein said act of determining further comprises acts of:

designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., if no network leader is specified, propose an election and choose a network leader with the highest weight in col. 15 lines 14-19);

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach a system of voting which elects a new leader. Kursawe, in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system (see section 2 lines 3-6), teaches:

transmitting a vote from each CCA-capable node to all other CCA-capable nodes designating which CCA-capable node should become a subsequent gateway CCA (i.e., broadcasting a vote to be received

by each participating network device in claim 1 first paragraph and section c); and

repeating the transmitting act (i.e., if no agreement is reached broadcast signed vote for use in a fallback agreement in section 67).

Based on Corson in view of Novaes, and further in view of Kursawe, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Kursawe to improve upon those of Corson in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system.

Corson, Novaes, and Kursawe do not teach tallying a set of votes for each candidate designated. Lisiecki, in order to provide fault-tolerance by leader election (see section 20), teaches:

tallying said votes for each CCA-capable node (i.e., candidates count the number of votes that they receive in section 133 lines 38-41), and when:

one CCA-capable node receives more votes than any of the other CCA-capable nodes, assigning the one CCA-capable node to become the new gateway CCA (i.e., a leader is selected as the first and only one candidate encountered with more than half of the votes in section 133 lines 38-41).

Based on Corson in view of Novaes, and further in view of Kursawe and Lisiecki, it would have been obvious to one having ordinary skill in the art at the time the invention

was made to utilize the teachings of Lisiecki to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 87, Corson and Novaes do not teach determining if whether two-thirds of the entities participating in a vote are active. Kursawe further teaches the method further comprising an act of determining if at least 2/3 (i.e., normal operation requires 2/3 of n participating devices to be honest in claim 2 section i) of the plurality of CCA-capable nodes are active (i.e., failure detector suspects some participant in a group as faulty in section 60 and 66), and wherein at least 2/3 of the CCA-capable nodes must respond before performing the act of transmitting the vote (i.e., abort the verification protocol where participants send their preliminary decision values to all other participants in section 66). Therefore, the limitations of claim 87 are rejected in the analysis of claim 86 above, and the claim is rejected on that basis.

With respect to claim 96, Corson does not teach designating a gateway CCA via transmitting votes and tallying them. Novaes, in order to elect a new subnetwork leader for a multicast unreachable subnetwork (see col. 4 lines 55-58), teaches the CCA-capable node further comprising:

a designation instruction block for designating one of the plurality of CCA-capable nodes to be a gateway CCA (i.e., if no network leader is specified, propose an election and choose a network leader with the highest weight in col. 15 lines 14-19).

Based on Corson in view of Novaes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Novaes to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

Corson and Novaes do not teach a system of voting which elects a new leader. Kursawe, in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system (see section 2 lines 3-6), teaches:

> a transmitting instruction block for transmitting a vote from the CCA-capable node to all other CCA-capable nodes designating which CCA-capable node should become a subsequent gateway CCA (i.e., broadcasting a vote to be received by each participating network device in claim 1 first paragraph and section c); and
>
> the transmitting instruction block transmits a second vote (i.e., if no agreement is reached, broadcast a signed vote for use in a fallback agreement in section 67).

Based on Corson in view of Novaes, and further in view of Kursawe, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Kursawe to improve upon those of Corson in order to use a fault-tolerant consensus protocol to propose an action required to be coordinated with all other processors of the system.

Corson, Novaes, and Kursawe do not teach tallying a set of votes for each candidate designated. Lisiecki, in order to provide fault-tolerance by leader election (see section 20), teaches:

> a tallying instruction block in the CCA-capable node for tallying said votes for each CCA-capable node (i.e., candidates count the number of votes that they receive in section 133 lines 38-41), whereby when one CCA-capable node receives more votes than any of the other CCA-capable nodes, an assigning instruction block for assigning the one CCA-capable node to become the new gateway CCA (i.e., a leader is selected as the first and only one candidate encountered with more than half of the votes in section 133 lines 38-41).

Based on Corson in view of Novaes, and further in view of Kursawe and Lisiecki, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Lisiecki to improve upon those of Corson in order to elect a new subnetwork leader for a multicast unreachable subnetwork.

With respect to claim 97, Corson and Novaes do not teach determining if whether two-thirds of the entities participating in a vote are active. Kursawe further teaches the network further comprising a determination instruction block for determining if at least 2/3 (i.e., normal operation requires 2/3 of n participating devices to be honest in claim 2 section i) of the plurality of CCA-capable nodes are active (i.e., failure detector suspects

some participant in a group as faulty in section 60 and 66), and wherein at least 2/3 of the CCA-capable nodes must respond before the transmitting instruction block transmits a vote (i.e., abort the verification protocol where participants send their preliminary decision values to all other participants in section 66). Therefore, the limitations of claim 97 are rejected in the analysis of claim 96 above, and the claim is rejected on that basis.

With respect to claim 106, the limitations of claim 106 are similar to the limitations of claim 86. Therefore, claim 106 is rejected with the same reasoning as claim 86.

With respect to claim 107, the limitations of claim 107 are similar to the limitations of claim 87. Therefore, claim 107 is rejected with the same reasoning as claim 87.

11. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Corson et al. ("Internet-Based Mobile Ad Hoc Networking", IEEE Internet Computing, July-August 1999, pages 63-70) in view of Novaes (US Patent No. 6,732,189 B1), and further in view of Chari et al. (US Application No. 2002/0107023 A1) and Elliott et al. (US Patent No. 6,335,927 B1).

With respect to claim 50, Corson, Novaes, and Chari do not teach determining or retrieving a gateway time and selecting a new gateway based on a comparison of these times. Elliott, in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information (see col. 1 lines 24-29), teaches the computer-readable medium wherein the act of selecting further comprises acts of:

determining a current time at which the message was received (i.e., list of gateways pinged can include the current gateway selected in col. 98 lines 33-34);

retrieving a gateway time at which a message from the gateway CCA was received (i.e., IP ping evaluates the time it takes for a message to take a round-trip from the gateway to the client in col. 98 lines 42-44); and

selecting and assigning a new gateway CCA based upon a result of a user-specified formula for comparing the current time and the gateway time (i.e., selecting the best choice for a gateway server in col. 97 lines 64-65; and ranking the pinged gateways in order of lowest latency in col. 98 lines 53-54).

Based on Corson in view of Novaes, and further in view of Chari and Elliott, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Elliott to improve upon those of Corson in order to route information through a hybrid network utilizing telephony routing information and internet protocol address information.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHERMAN LIN whose telephone number is (571)270-

7446. The examiner can normally be reached on Monday through Friday 8:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joon Hwang can be reached on 571-272-4036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. L./
Examiner, Art Unit 2447
2/12/2009

/Joon H. Hwang/
Supervisory Patent Examiner, Art Unit 2447